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Technical Report 832

Estimating the Army's Prime Recruiting Market

Naomi Verdugo
U.S. Army Research Institute

Kenneth R. Berliant
U.S. Army Recruiting Command

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April 1989

United States Army Research Institute for the Behavioral and Social Sciences

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COL, IN
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Technical review by

Curtis L. Gilroy
Charles C. McCloskey, Program Analysis and Evaluation, USAREC
Douglas McLiverty

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The Army's prime recruiting market is defined as 17- to 21-year-old males who are high school diploma gradutes (HSDG), score in the upper half of the Armed Forces Qualification Test (AFQT), and are physically and morally qualified for military service. These males are not institutionalized, are not in military service, have no prior service, and are not in college. (This is also referred to as the "high-quality" male population.) The male prime market is estimated to decline approximately 21% between 1985 and 1995, though the male youth population will decline only 12% during this period. These figures suggest increased difficulty for military recruiters. "High-quality" males will be in great demand by the military, employers, and colleges in the years ahead.

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Estimating the Army's Prime Recruiting Market

Naomi Verdugo
U.S. Army Research Institute

Kenneth R. Berliant
U.S. Army Recruiting Command

Manpower and Personnel Policy Research Group
Curtis L. Gilroy, Chief

Manpower and Personnel Research Laboratory
Newell K. Eaton, Director

U.S. Army Research Institute for the Behavioral and Social Sciences
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

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FOREWORD

This work was requested by the U.S. Total Army Personnel Agency (TAPA) in May 1988. Army decisionmakers and personnel planners are concerned about recent declines in the general youth population and the Army's ability to attract a sufficient number of high-quality youth who are both morally and physically eligible for military service. Estimates of the prime recruiting market enable Army planners and decisionmakers to develop strategies to better attract high-quality youth to military service.

This work has been conducted in collaboration with the Research and Studies Division of the U.S. Army Recruiting Command (USAREC). Work on prime recruiting market estimates has been conducted by USAREC since the early 1980s.

Conducting research to assist the Army in meeting its annual accession requirements is an essential part of the mission of the Army Research Institute for the Behavioral and Social Sciences' Manpower and Personnel Policy Research Group, Manpower and Personnel Research Laboratory. Portions of this research were briefed to BG Wheeler, Director, Enlisted Personnel Management, TAPA, in May 1988.

These findings will be used by USAREC for enlistment forecasting models and by TAPA to model enlistment and logistical issues.

EDGAR M. JOHNSON
Technical Director

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The authors are grateful to Ms. Carol Struck of the U.S. Army Recruiting Command, Ms. Lynne Heltman of the Veterans Administration, Dr. Gregory Spencer and Ms. Signe Wetrogan of the Census Bureau, and Ms. Deborah Gerald of the National Center for Education Statistics, Department of Education, for their generous assistance in providing the data for this work. The authors also thank COL William Solomon of U.S. Total Army Personnel Agency for his assistance in obtaining military data and for his interest in this work. Finally, the authors are grateful to Mr. Roy Nord of the U.S. Army Research Institute for his analysis of the National Longitudinal Survey Profile of American Youth.

NAOMI VERDUGO
KENNETH R. BERLIANT

ESTIMATING THE ARMY'S PRIME RECRUITING MARKET

EXECUTIVE SUMMARY

Requirement:

Military personnel planners need accurate estimates of the potential pool of military recruits to plan for future resource needs. The prime recruiting market is defined as 17- to 21-year-old males who score in the upper half on the Armed Forces Qualification Test (AFQT), are high school diploma graduates (HSDG), and are morally and physically qualified for military service. Prime recruits have not been institutionalized, are not in military service, have no prior service, and are not in college. This report provides estimates of the prime market for 1985-1995.

Procedure:

The authors analyzed data from a variety of sources, including the Census Bureau, Department of Education, Veterans Administration, and Department of Defense. The prime market is estimated by subtracting the following groups from the total male population age 17-21: institutionalized males age 17-21; males 17-21 who would score in the lower half of the AFQT; males in the upper half of the AFQT distribution who do not hold high school diplomas; and males who are not morally or physically fit for service. Also excluded from the prime market estimates are qualified males age 17-21 who are in college and males currently or previously in the military. Researchers used base data from the U.S. Bureau of the Census to estimate the prime market.

Findings:

This research finds that the number of prime market males has been declining dramatically due to declines in the youth population. However, declines in the prime market outpace the declines occurring in total youth population.

These new estimates of the prime market, though higher than earlier, do not suggest that recruiting should be easier. Rather, they point out the tremendous resources that will continue to be required to attract prime market males into the Army, assuming there are no decreases in the average accession mission requirements during fiscal years 1990-1995.

Utilization of Findings:

These estimates are used by the U.S. Army Recruiting Command (USAREC) and other Army agencies to develop forecasting models to enhance recruiting effectiveness and optimize recruiting resource allocations. USAREC also uses these estimates to make policy decisions concerning recruiting requirements for the years ahead.

ESTIMATING THE ARMY'S PRIME RECRUITING MARKET

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ESTIMATING THE ARMY'S PRIME RECRUITING MARKET

Introduction

The "prime market" refers to that portion of the 17- to 21-year-old male population who are not institutionalized, not in military service, have no prior military service, and are deemed morally and physically qualified for military service, are high school diploma graduates (or high school seniors who will graduate by the end of the school year), and score in the upper half of the Armed Forces Qualification Test (AFQT).[1] This concept is identical to QMA (qualified military available) males, a term frequently used by the other military services. The prime market is a subset of the "military eligible" male population. "Military eligible males" is a broader term encompassing the prime market males, but also some males who do not have a high school diploma, who score in the lower half on the AFQT, or are over 21 years old.

Prime market males are that segment of the male population who are in highest demand by the military services. Research shows that these males are less likely than other males to become attritees (i.e., separate before the end of their tour), and are easier to train. However, not only do the military services compete among each other for this group, but the high quality market is also in great demand by colleges and employers. Hence, this group has wide opportunities open to it, thus making the job of military recruiters a difficult one.

This paper focuses on how the most recent estimates and projections of the prime market were developed. Knowing the size of the prime market population helps to determine market share (or market penetration)--that proportion of the group which is accessed into the military in general, and each service specifically. While our ultimate goal is to estimate the size of the prime market at subnational levels of geography (e.g., Army recruiting brigades, Army recruiting battalions, and counties), this is not currently possible, due to a lack of representative ASVAB and health data for small areas. If precise estimates of the prime market could be produced, these data would be an additional tool to use in assigning recruiters and locating recruiting stations, as well as helping to place military advertising. It is hoped that work currently in progress by the

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[1]The definition "prime market" is restricted to males. The female equivalent for prime market would be 17- TO 21-year-old females who score in the upper half on the AFQT, are high school diploma graduates (HSDG), and are morally and physically qualified for military service, non-institutionalized, not in military service, not prior service, and not in college.

National Academy of Science, Committee on National Statistics, will shed some light on how best to estimate the qualified military available at the subnational level. However, current work by the National Academy of Science will not consider the medical and moral fitness of youth, so the resulting small area estimates will be higher than the actual number of QMA or prime market males.

Estimates of the prime market at the national level are complicated by the requirement that these estimates be projected at least several years into the future.

Our estimates and a discussion of the methodology are provided in the following section. The final section provides a summary of the report, a discussion of the implications, and recommendations for improving prime market estimates. Appendix A presents the estimation methodology in the form of equations.

Estimates of The Prime Market

Table 1 shows current estimates of the male prime market and the population segments from which it is derived. Note that estimates decline to a minimum in 1994, and then begin a slight rise in 1995. (See Figure 1.) This is consistent with estimates of the total male population age 17-21.

Estimates and projections of the prime market were calculated using a variety of data sources. Data and information from the Census Bureau, the Department of Education, Department of Defense, and Veterans Administration were used along with our own analyses using the National Longitudinal Survey Profile of American Youth (NLS). While it would have been ideal to have all the data from a single source, there is at present no database which contains the variety of information required to estimate the number of prime market males. Consequently, we combined data from several sources which results in some estimation errors. In the paragraphs which follow we discuss the data sources and methodology used to calculate each step taken to estimate the prime market. A flowchart identifying these steps is shown in Figure 2.

The Base Population

The starting place for any estimate of prime market males is the total male population age 17-21. (See column a, Table 1.) Estimates of the population are for the period 1985-1995.

Population data for 1985-1986 are published by the U.S. Bureau of the Census (1988:12-13). Data for 1987-1995 are unpublished population projections provided by the Census Bureau under contract to ARI. Figures in Table 2 include Armed Forces overseas.

TABLE 1

ESTIMATES OF MALE YOUTH IN THE PRIME MARKET
(numbers in thousands)

YEAR	MALES AGE 17-21 (a)	NONINSTITUTIONALIZED MALES 17-21 (b)	MEDICALLY & MORALLY QUALIFIED NONINSTITUTIONALIZED (c)	QUALIFIED NON-MILITARY NON-PRIOR SERVICE (d)	QUALIFIED NON-MILITARY NPS HSDG, UPPER MENTAL CATEGORY (e)	QUALIFIED IN COLLEGE (f)	PRIME MARKET MALES 17-21 (g)
85	9,860	9,732	8,039	7,053	3,019	1,463	1,556
86	9,609	9,484	7,834	6,846	2,923	1,430	1,493
87	9,498	9,375	7,744	6,751	2,876	1,420	1,456
88	9,535	9,411	7,773	6,776	2,880	1,385	1,495
89	9,464	9,341	7,716	6,699	2,840	1,395	1,445
90	9,334	9,213	7,610	6,588	2,774	1,382	1,391
91	9,126	9,007	7,440	6,381	2,674	1,346	1,328
92	8,913	8,797	7,266	6,228	2,591	1,303	1,288
93	8,632	8,520	7,038	6,000	2,484	1,266	1,218
94	8,591	8,479	7,004	5,966	2,464	1,250	1,214
95	8,652	8,540	7,054	6,016	2,485	1,259	1,226

(a) Unpublished data from the Census Bureau.

(b) Census report series P-25, No. 952, p.173.

(c) Rate from Curtis, Borack, and Wax, Estimating the Youth Population Qualified for Military Service, Navy Personnel Research and Development Center (NPRDC), August 1987.

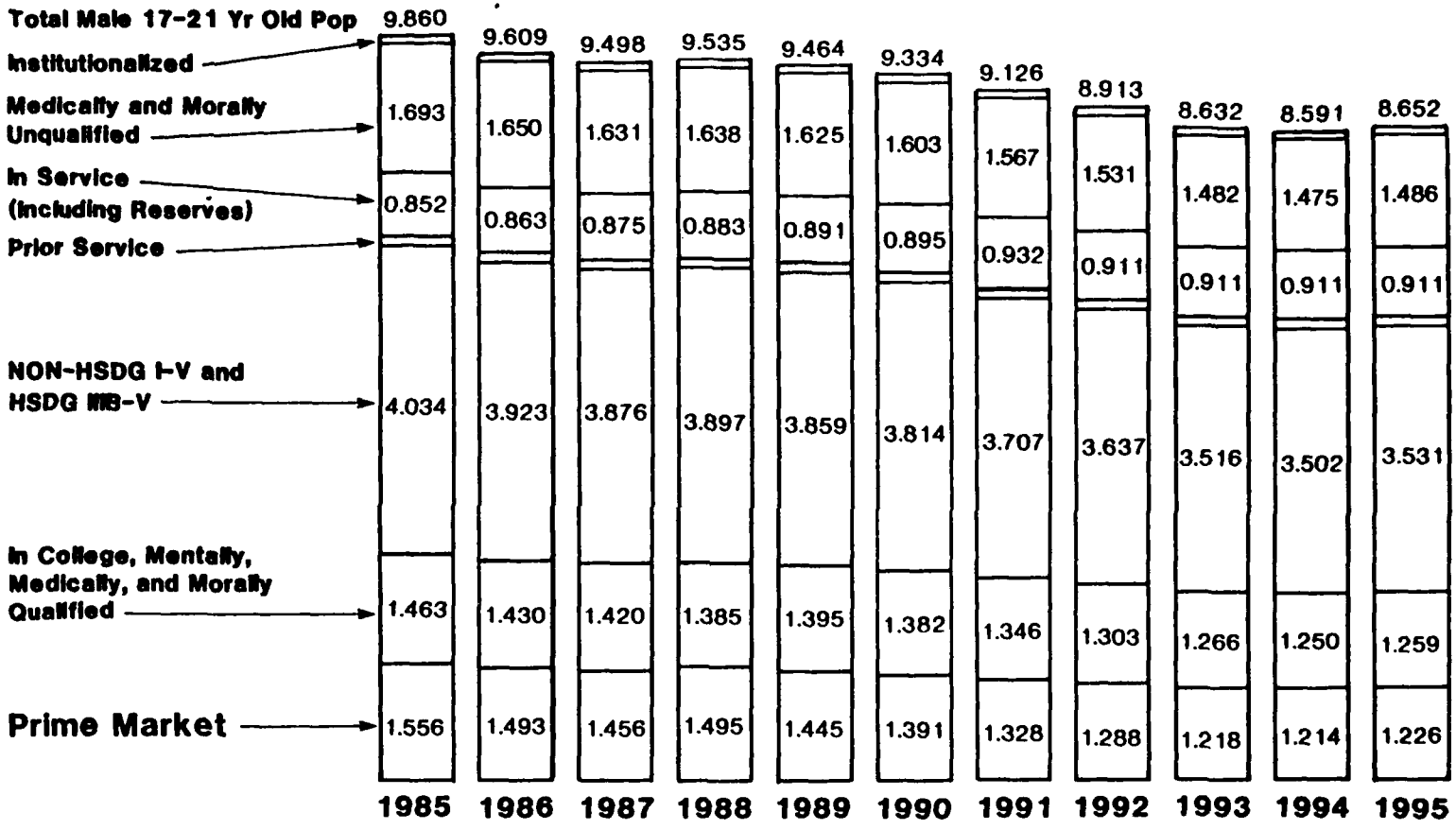
(d) Department of the Army, POM FY80-92, June 1986; Office of the Assistant Secretary of Defense (Reserve Affairs), Official Guard Reserve Manpower Strength and Statistics, March 1986; and Veterans Administration, July 1988.

(e) Rate from 1980 National Logitudinal Survey (NLS) as published in Verdugo & Nord, Projections of the Male Youth Population and Enlistment Propensity by Army Recruiting Battalion, 1980 - 1995, Army Research Institute, Research Product 87-34, October 1987, p.8.

(f) Unpublished data from Department of Education, National Center for Education Statistics, combined with analyses of the NLS.

(g) *These data are computed using the above columns as follows:* $g = e - f$.

MALE POPULATION PRIME MARKET ESTIMATES
(In Millions)



Prime Market Consists of 17-21 Yr Olds, NPS , HSDG, TSC I-IIIA, Medically and Morally Qualified, Not in Service, in College or Institutionalized

Sources: Army Research Institute/Census Buresu, OASD, Navy Personnel Research and Development Center, The National Center for Education Statistics, and the Veterans Administration.

Figure 1. Prime Recruiting Market

THE PRIME MARKET

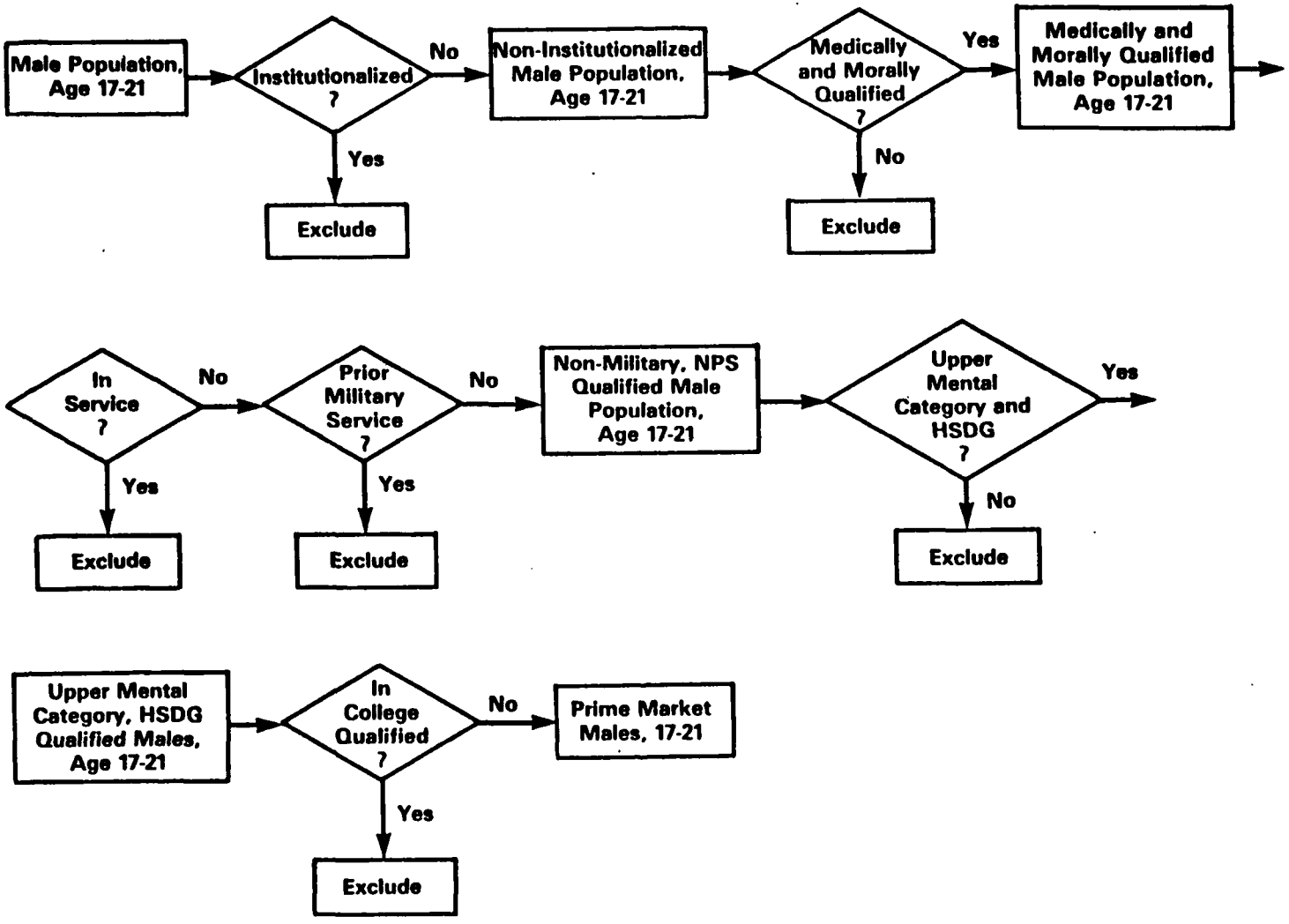


Figure 2. Flow chart of calculations to estimate the Prime Market.

US Army Recruiting Command
US Army Research Institute

July 88

Table 2

Total Population Estimates and Projections (in thousands) of Males Age 17-21

Year	Male Pop 17-21
85	9,860
86	9,609
87	9,498
88	9,535
89	9,464
90	9,334
91	9,126
92	8,913
93	8,632
94	8,591
95	8,652

The figures in Table 2 include some unknown number of undocumented aliens, a group which is not eligible for military service. Because we have not explicitly subtracted undocumented males from our estimates of the prime market, it would seem that the resulting figures are overestimates. However, it is likely that any overstimate due to counting illegal aliens is offset by the undercount of black males in the 20-24 year old age group. The completeness of coverage for black males age 20-24 has been estimated as .92776 (an undercount of.07224). (For more on the completeness of coverage in the decennial census, see U.S. Bureau of the Census, 1984:175.)

The Institutionalized Population

Estimates of the male population age 17-21 must be reduced by the number of males in that age group who are institutionalized. This group includes the incarcerated population, mentally and physically handicapped individuals living in special schools or institutions, persons in drug or alcohol treatment programs, and other hospitalized individuals who do not have a home in which they could be counted. Institutionalized individuals are excluded from estimates of the prime market because they are not eligible for military service.

The proportion of noninstitutionalized males age 17-21 is not immediately available from the Census Bureau. What is available are two ratios; one for males age 15-19 (.988243), and another for males age 20-24 (.984239) (U.S. Bureau of the Census, 1984:173). These ratios were weighted together in proportion to

the number of years of the 17 - 21 age group covered. The result is:

$(3\ (.988243) + 2\ (.984239))/5 = 4.933207/5 = .986641 \cong .987$

The resulting noninstitutionalized population is shown in column b, Table 1. Table 3 shows annual estimates of the institutionalized and noninstitutionalized population.

Table 3

Estimates and Projections (in thousands) of Noninstitutionalized Males Age 17-21

Year	Male Pop 17-21 (a)	Noninstitutionalized Population (b) b=(a)(.987)	Institution-alized Pop (c) c=a-b
85	9,860	9,732	128
86	9,609	9,484	125
87	9,498	9,375	123
88	9,535	9,411	124
89	9,464	9,341	123
90	9,334	9,213	121
91	9,126	9,007	119
92	8,913	8,797	116
93	8,632	8,520	112
94	8,591	8,479	112
95	8,652	8,540	112

The predominant group of the institutionalized male population age 17-21 is comprised of incarcerated individuals. Fully 46% of the institutionalized male population in that age group were incarcerated in 1987. It appears that between 1981 and 1986 the proportion of males 17-21 who were incarcerated did not change significantly. This is due to the fact that incarcerated persons are typically about 23 or 24 years old before they enter prison. Though the incarcerated population has grown, most likely as a result of changes in sentencing policies, this growth has occured primarily among males in the mid- to late twenties.[2] Due to the relative stability of these estimates, the

[2]Information on the incarcerated population is unpublished and was provided by Dr. Chris Innes, Bureau of Justice Statistics, Department of Justice, telephone conversation 28 June 1988.

1980 proportion of noninstitutionalized males age 17-21 has been applied to each year in the series (1985-1995).

The Medically and Morally Qualified Population

Determining the proportion of the population who are morally or medically fit for service is, unfortunately, largely speculative. Data on physical disqualification rates date from the Korean War or earlier, so it is unclear how accurately they reflect the fitness of today's youth. Further, there may be some non-independent statistical relationship between medical, moral, and mental qualifications. For example, it would not be too surprising if it were found that college males have different medical and moral disqualification rates than other youth. To our knowledge, however, no research in this area has been conducted. Such research would help to improve these estimates, but would likely require the collection of new data consistent with the military's moral and medical screenings.

Upon the advice of the U.S. Army Recruiting Command, the physical disqualification rate of 14% was assumed. This is the same rate used by the Navy Personnel Research and Development Center (NPRDC), and it is based on research by Karpinos (1975, 1972, 1960) from the Korean War, though it may not accurately reflect the health status of present day youth. A recent study using the National Health and Nutrition Examination Survey (NHANES), data collected in 1978-1980, found a somewhat higher proportion of physically disqualified males, 18.3%, though this was for the 16-to 24-year-old age group (Overbey et al., no date, p. 23). However, the authors noted that the data available from the NHANES did not include all criteria required to pass the military's physical screening. Data on visual acuity, dental health, mental disorders, and limitations of motion of the extremities were not collected at all, or were not evaluated as extensively as in military screening. Though, the 18.3% estimate may understate the true disqualification rate, it reflects an older age group than that we are considering. Also, the small samples of black and Hispanic youth included in the NHANES render these estimates of physical disqualification less than representative. Subsequesnt estimates of the prime market must reflect drug & alcohol tests of military applicants. Preliminary data suggest that about 4% of Army applicants are disqualified for military service due to positive drug and/or alcohol test results (Carney, 1988).

The incidence of AIDS in the male 17- to 21-year-old population is another largely unquantifiable variable in the medical fitness of this cohort. The Centers For Disease Control of the Department of Health and Human Services estimate that about 21% of all reported AIDS cases are in the 20- to 29-year-old cohort (male and female), and that more than 60% of all reported cases are among males. Military testing of civilian

applicants for military service indicates a rate of AIDS prevalence for males of 1.5/1000 applicants tested. Over time AIDS infection may have a significant impact on the fitness of this cohort for military service.

Moral disqualification rates were assumed to be 3.9%. This is based on information provided by the U.S. Army Recruiting Command, and this same rate is also used by NPRDC in their research. This rate was derived by Karpinos (1960) and is based on data from the Korean War. There is a need to re-estimate moral disqualification rates using more current data. The FBI's Uniform Crime Reports (UCR) data provides information on the number of arrests by offense, for males and females separately by age. However, this is a summary tape file, not microdata, so it is not possible to track multiple arrests of the same individual. Estimating the number of youths with arrest records is not possible using UCR data. To the degree that individuals are arrested more than once between the ages 17-21, UCR data will overstate the number of youth with criminal records. Investigation may uncover other data sources which can be used to estimate the moral fitness of young men today for military service.

The overall moral and medical qualification rate is computed as follows: (moral qualification rate, 96.1%) x (physical qualification rate, 86%) = 82.6%. Annual tabulations are shown in Table 4. The resulting noninstitutionalized population of males age 17-21 who are medically and morally qualified for service are shown in column c of Table 1.

Table 4

Estimates and Projections (in thousands) of Medically and Morally Qualified Males Age 17-21

Year	Noninstitutionalized Population (a)	Medically and Morally Qualified Pop (b) b=(a)(.826)	Medically and Morally Unqualified Pop (c) c=a-b
85	9,732	8,039	1,693
86	9,484	7,834	1,650
87	9,375	7,744	1,631
88	9,411	7,773	1,638
89	9,341	7,716	1,625
90	9,213	7,610	1,603
91	9,007	7,440	1,567
92	8,797	7,266	1,531
93	8,520	7,038	1,482
94	8,479	7,004	1,475
95	8,540	7,054	1,486

Military Personnel and Prior Service

Estimates of the prime market would be inflated if those males age 17-21 already in the military were not omitted from the estimates. Clearly, those in the military cannot be considered part of the "recruitable" market since they are already serving. Estimates and projections of the number of males age 17-21 on active duty, as well as in the Reserve and Guard, were subtracted from the total medically and morally qualified male population. (See Table 5.) Data include active duty military, as well as Reserve and Guard, but do not include IRR (Individual Ready Reserve). These data were provided by USAREC, and include all the military services except the Coast Guard which, during peace time, is a part of the Department of Transportation.

Table 5

Estimates and Projections (in thousands) of In-Service Military Personnel, Veterans, and Other Prior Service Males Age 17-21

Year	Medically and Morally Qualified Pop (a)	In Service Males 17-21 (b)	Prior Service Males 17-21 (c)	Non-Military, NPS Qualified Males 17-21 (d) d=a-(b+c)
85	8,039	852	134	7,053
86	7,834	863	125	6,846
87	7,744	875	116	6,751
88	7,773	883	114	6,776
89	7,716	891	126	6,699
90	7,610	895	127	6,588
91	7,440	932	127	6,381
92	7,266	911	127	6,228
93	7,038	911	127	6,000
94	7,004	911	127	5,966
95	7,054	911	127	6,016

Estimates of medically and morally eligible males age 17-21 must be reduced not only by the number in the military, but also by those who have previous military service. Estimates and projections of active-duty veterans and those who left the active-duty military with less than 2 years of service (attritees)[3] age 17-21 were obtained from the Veterans Administration for each year of the 1985-1995 period. These figures were reduced by 10% to eliminate females and yield an estimate of males with prior military service. After removing in-service males, veterans, and attritees from the morally and medically qualified population, the result is the non-military, non-prior service (NPS) qualified population shown in column d, Table 1.

Note that estimates of prior service males include only active-duty veterans and attritees. Due to the 8 year commitment for those entering the Reserve and Guard, there should be few if any 17- to 21-year-olds with prior service in the Reserves or Guard.

[3]Those with less than 2 years of military service are not considered veterans by the Veterans Administration.

Mentally Qualified, High School Diploma Graduates

Among other qualifications, the prime market is limited to those scoring in the upper half on the Armed services Vocational Aptitude Battery (ASVAB) and who are high school diploma graduates. The ASVAB was normed in 1980 such that 50% of the population would have test scores in the upper half of the distribution. These high scorers are referred to as being in test score categories (TSC) I-IIIA. The remaining 50% would score in the lower half of the ASVAB test (TSC IIIB-V). However, the test was normed on a population of males and females age 17-23. Because this analysis of the prime market examines only males age 17-21, somewhat less than 50% scored in the upper half of the test. This is because ASVAB test scores are slightly affected by the age of the test taker. More significantly, however, these test scores are influenced by race and ethnicity. Blacks and Hispanics tend to receive lower scores on the ASVAB than whites (Eitelberg, et al., 1984, p. 62). Hence, as minorities comprise increasing proportions of the youth population, all other things being equal, the overall ASVAB test performance of youth will decline. These estimates account for increasing proportions of minority youth projected through 1995 by computing race-specific HSDG and ASVAB test score category distributions (Verdugo & Nord, 1987).

The mental qualification rates shown in column b, Table 6 are estimated from the Army Research Institute's analysis of the NLS as applied to population estimates and projections provided by the Census Bureau. (See Verdugo & Nord, 1987, pp. A-57 and B-57.) Data on the high school diploma status of 17- to 21-year-old males was also gathered from the NLS. These data show that about 89% of those 17- to 21-year-old males scoring in the upper half of the ASVAB were high school diploma graduates. Hence, the proportion who are in TSC I-IIIA was multiplied by 89% yielding the data provided in column c, Table 6 and column e, Table 1.

Table 6

Estimates and Projections (in thousands) of Males Age 17-21 by Mental Category and High School Graduation Status

Year	Non-Military, NPS Qualified Males 17-21 (a)	TSC I-IIIA Rates for Males 17-21 (b)	Non-Military, NPS, HSDG, I-IIIA Males 17-21 (c) c=(a)(b)(.89)	Non-Military, NPS, HSDG IIIB-V and NHSDG I-V Males 17-21 (d) d=a-c
85	7,053	48.1	3,019	4,034
86	6,846	48.0	2,923	3,923
87	6,751	47.9	2,876	3,875
88	6,776	47.9	2,880	3,896
89	6,699	47.7	2,840	3,859
90	6,588	47.5	2,774	3,814
91	6,381	47.2	2,674	3,707
92	6,228	47.0	2,591	3,637
93	6,000	46.7	2,484	3,516
94	5,966	46.6	2,464	3,502
95	6,016	46.6	2,485	3,531

Note that high school diploma graduates include seniors who will graduate with a high school diploma by the end of the school year. However, the category excludes high school dropouts, those who earn a GED (General Equivalency Degree), and those who receive certificates of attendance or similar non-diploma certificates. Beginning 1 October 1988 Army applicants with Adult Basic Education (ABE) certificates will be treated as high school graduates. This group, however, comprises a very small segment of all applicants, and should not affect the prime market estimates and projections presented here.

The College Population

Youth who attend college either full- or part-time are excluded from the prime market. This reflects the policy to not recruit students who are currently attending college. However, given that part-time students may find the Army College Fund particularly appealing, this position needs to be examined closely. The only rationale for eliminating college students from the prime market is that they are difficult to recruit.

Preceding estimates have already limited the population to

medically, morally and mentally qualified noninstitutionalized, non-military, NPS, HSDG males age 17-21. Hence, we must reduce the number of males age 17-21 enrolled in college to reflect that not all those enrolled are upper mental category high school diploma graduates. (Analysis of the NLS revealed that among those attending college full-time, 71.1% are upper mental category HSDG. For part-time college students only 55.6% are HSDG, TSC I-IIIA. See Table 7.) Nor are all those enrolled medically and morally qualified. Because we do not know the actual moral and medical qualification rates of college students, we have assumed that these rates are identical to those used in earlier steps (i.e., 96.1% are morally qualified and 86% are medically qualified), yielding an overall qualification rate of 58.8% for full-time college students, and 46% for part-time college students. The sum of qualified part-time and full-time college enrolled males is shown in column f, Table 1.

Table 7

Estimates and Projections (in thousands) of Male College Students Age 17-21

Year	Part-Time College (a)	HSDG I-IIIA Part-Time College (b) b=(a)(.46)[1]	Full-Time College (c)	HSDG I-IIIA Full-Time College (d) d=(c)(.588)[2]	Total Qualified Males 17-21 in College (e) e=b+d
85	320	147	2,237	1,315	1,463
86	309	142	2,191	1,288	1,430
87	297	137	2,183	1,284	1,420
88	293	135	2,126	1,250	1,385
89	289	133	2,147	1,262	1,395
90	286	132	2,127	1,251	1,382
91	282	130	2,068	1,216	1,346
92	278	128	1,998	1,175	1,303
93	274	126	1,939	1,140	1,266
94	270	124	1,915	1,126	1,250
95	267	123	1,932	1,136	1,259

Note. Column b = column a x .556 x .961 x .86 = column a x .46
Column d = column c x .711 x .961 x .86 = column c x .588
Column a & c Source: Unpublished data from Department of Education, National Center for Education Statistics.

The number of males age 17-21 who are in college has not been adjusted by a dropout rate. Research on college dropouts has been problematic and of questionable validity. Data on college dropouts from the Department of Education, National Center for Education Statistics (NCES) is based on an older study, which computed a rate based on both full-time and part-time college students. The formula used is: college freshmen in a given year divided by baccalaureate degrees awarded 4 years later. The resulting dropout rate was 50%. However, results are questionable due to the inclusion of part-time students who, by definition, will not graduate in 4 years. Further, significant numbers of full-time students take the minimum number of full-time units and thus require more than 4 years to graduate. While 50% is probably an overestimate of the college dropout rate, a more sophisticated study of this topic is warranted. Though these prime market estimates assume a dropout rate of 0%, subsequent estimates will reflect some positive dropout rate.

The Prime Market

The male prime market refers to those 17- to-21-year-old men who are upper mental category, high school diploma graduates and who are both morally and physically qualified for military service. Excluded from this group are those enrolled in college either full- or part-time, those serving in the military, and military veterans and attritees. The resulting prime market population estimates for 1985-1995 are shown in column g, Table 1.

Between 1985-1995 the number of prime market males is projected to decline by 21%. This far exceeds the 12% decline in the total male population age 17-21 occurring during the same period.

It is important to emphasize that these figures are only estimates and projections, and that the actual size of the male prime market may be either larger or smaller than shown. The following factors would cause the estimates and projections to understate the actual size of the male prime market. First, the undercount of young black men in the 1980 census has a ripple effect. This means that estimates and projections of the youth population are slight underestimates of the true population size. Second, military veterans, attritees, and those currently in the military (either active-duty, Reserve or Guard) who are enrolled in college are being subtracted out twice; once when we remove those enrolled in colleges, and again when we remove those in the service and those with prior military experience. This occurs because we do not know the number or proportion of 17- to-21-year-old males in these categories who are enrolled in college. Third, subtracting college-enrolled males age 17-21 without correcting for the significant dropout rate yields low estimates

of the prime market. These dropouts should be added back in to the prime market. Due to the lack of a reasonable estimate of college dropouts, this factor is simply ignored. Hence, estimates of the prime market are an underestimate to the degree that 17- to 21-year-old males drop out of college. Fourth, projections of the in-service male population in the coming years may be too high given recent end-strength reductions. We are currently re-examining these estimates to see if they can be improved. If estimates of the the military population subtracted from the prime market are larger than actual end-strengths, then the prime market is being underestimated. Finally, data provided by the Department of Education tabulates the college-enrolled age groups as follows: 14-17, 18-21. Consequently, we assumed that all those in the 14-17 year old age group in college are actually 17 and so were subtracted from the prime market. In fact, the vast majority of this age group who are in college are age 17, however a very small percent are younger. Hence, this results in a very slight underestimate of the prime market.

The factors noted above which may yield underestimates of the prime market are, to some unknown degree, mitigated by the fact that our estimates of the base population include some unknown number of undocumented aliens who are not eligible for military service. Further, the assumption that 14% of male youth age 17-21 are medically unqualified for military service may be too low. Despite this, it is likely that estimates of the prime market are conservative, and thus may understate the true size of the male prime market.

Conclusions

Summary

The prime market refers to 17- to 21-year-olds who are not institutionalized, are medically and morally qualified for military service, are not currently serving in the military, and have not served previously. The prime market is also limited to those who score in the upper half of the ASVAB, are high school diploma graduates, and, finally, are not enrolled in college. This subset of the youth population is in great demand by the military, and also by colleges and employers as well. It is important to know the size of this prime recruitable market in order to estimate market penetration for military recruiters, and to estimate future recruiting resource requirements. The estimates and projections provided in this report refer to prime market males and are for each year from 1985-1995.

As shown in Figure 2, estimating the prime market is a multi-stage process. Segments of the population ineligible for military service are subtracted from the total population until we are left with residual estimates of the prime recruitable market.

Implications

What do current estimates and projections of the prime market mean for Army recruiting in the years ahead? Clearly, the declining prime market (see column g, Table 1) makes recruiting more difficult, all other things being equal. The Army recruits and trains a larger number of youth than any other military service or single employer. In FY 87 the U.S. Army accessed about 133,000 males and females (including prior service). About 10% of this number were females. Of the males, about 74% were between the ages of 17-21.

Using current (FY 87) accession policies and force structure to determine the size and composition of the active-duty Army in FY 95, it appears that the Army would need about 65,057 HSDG, I-IIIA males in FY 95. Projections of the prime market for FY 95 show 1,226,000 prime market males available to recruit. This suggests that the Army must access 1 of every 19 prime market males, based on current force strength and policies. By comparison, the Army only had to access 1 of every 22 prime market males in FY 87. Given the competition from other services, colleges, and employers -- all of whom will be heavily recruiting from this same market -- Army recruiting in the 1990s will not be easy.

In addition to the decline in the prime market, not all males have a "positive propensity" to enlist in the Army. Data from the National Longitudinal Survey, Profile of American Youth from 1979-1983 have been used to estimate propensity. Respondents who answer the question "How likely are you to enlist in the Army?" with very likely or somewhat likely are considered to have positive propensity to enlist. These propensities vary from less than 1 percent to about 21 percent depending on one's race/ethnicity, level of education, and performance on the AFQT. Among high school diploma graduates in test score categories I-IIIA (the group from which the prime market is derived), relatively few have positive propensities to enlist in the Army (Verdugo and Nord, 1987). Even the positively propensed male population is estimated to decline by 26% between 1980-1995. HSDG, I-IIIA males with positive propensities are projected to be about 49,729 in FY 95, down from 67,583 in FY 80. With Army manpower requirements for this group expected to be 65,057, there is a shortage of some 15,328 upper mental category recruits (65,057 - 49,729 = 15,328).

Finally, these new estimates of the prime market show that there are more prospects who would qualify for military service than previously believed, but that it is considerably more difficult to attract them than was realized. Estimates for 1987 show that about 4% of the prime market is brought into the Army (65,057/1,456,000). This suggests that greater resources are needed to attract higher proportions of the prime market to military service. Hence, estimates of a prime market larger than was previously realized does not demonstrate that recruiting is easier than we once thought. Rather, it demonstrates that significant resources are needed to bring high quality young men into military service.

Improving the Estimates

It should be noted that estimates and projections of the prime market are subject to error. The previous section outlined caveats in great detail. Suffice to say that these prime market figures are probably underestimates of the true size of the male prime market. Precision of these estimates could be improved by having a single database from which to derive prime market estimates. This would avoid a weakness of the current estimates which require subtracting some groups out more than once. Short of this, research into the following areas would benefit estimation methodology: Are mental, moral and medical disqualification rates uniform across all segments of the population (as has been assumed for these estimates), or does this vary across groups? What proportion of upper mental category, HSDG in-service personnel, military veterans, and those with prior military service are enrolled in college? What proportion of 17- to-21-year-old HSDG, I-IIIA males drop out of college? How accurate are the moral and medical disqualification rates used here? These need to be re-examined using more current, nationally representative data.

Finally, as mentioned earlier, prime market estimates at the recruiting brigade, battalion, and county levels are needed to enhance ARI, USAREC, and other Army forecasting and resource allocation models. At present the databases available to achieve these levels of prime market estimation do not exist. We believe that the resources to establish these databases is a DoD responsiblity since all of the military services will draw upon such prime market estimates for recruiting purposes.

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APPENDIX

EQUATIONS FOR ESTIMATING THE PRIME MARKET

I. Calculate 17-21 year old males who are noninstitutionalized.

$$N(\bar{I}) = N * P(\bar{I}) \quad (1)$$

Where:

$N(\bar{I})$ = Noninstitutionalized males age 17-21

N = 17-21 year old males

$P(\bar{I})$ = Proportion of 17-21 year old males who are not institutionalized

II. Calculate the 17-21 year old noninstitutionalized male population who are medically and morally qualified (Q).

$$Q = N(\bar{I}) * P\ (M_1 U M_2 | \bar{I}) \quad (2)$$

Where:

$N(\bar{I})$ = Noninstitutionalized males age 17-21

$P(M_1 U M_2 | \bar{I})$ = Proportion of noninstitutionalized males who are medically ($P[M_1 | \bar{I}]$) and morally ($P[M_2 | I]$) qualified

III. Calculate 17-21 year old males who are prior service or currently in service (active duty, reserve or Guard).

$$A = A_T * .30 = \text{Active duty 17-21 year old males} \quad (3)$$

$$R = R_T * .19 = \text{Reserve/Guard 17-21 year old males} \quad (4)$$

Where: A_T = Total active duty males

R_T = Total reserve & guard males

$$Q(\bar{M}) = Q - A - R - PS$$

Where:

$Q(\bar{M})$ = Qualified 17-21 year old males not in the military & not prior service

A = 17-21 year old males on active duty

R = 17-21 year old males on reserve/guard duty

PS = 17-21 year old prior service males (includes veterans and attritees)

IV. Calculate 17-21 year old noninstitutionalized males who are HSDG, I-IIIA, medically and morally qualified, not in military service nor prior service.

$$NPSA = Q(\bar{M}) * P(GMA) \quad (5)$$

Where:

NPSA = noninstitutionalized males age 17-21 who are not in the military nor prior service, who are medically and morally qualified HSDG, IIIAs.

$Q(\bar{M})$ = medically and morally qualified males age 17-21 who are not in the military nor prior service.

P(GMA) = proportion of males age 17-21 who are HSDG I-IIIA

V. Calculate the "prime market" (i.e., 17-21 year old noninstitutionalized males who are medically and morally qualified, not in the military nor prior service, HSDG, I-IIIAs who are not in college either full- or part-time).

$$PM = NPSA - C_{FQ} - C_{PQ} \quad (6)$$

Where:

PM = prime market males age 17-21

NPSA = noninstitutionalized males age 17-21 who are not in the military nor prior service, who are medically and morally qualified HSDG, I-IIIA

C_{FQ} = 17-21 year old males, HSDG, I-IIIA, medically and morally qualified attending college full-time

C_{PQ} = 17-21 year old males, HSDG, I-IIIA, medically and morally qualified attending college part-time

NOTE:

$$C_{FQ} = C_F * P(A|C_F) * P(M_1 U M_2 | \bar{I}) \quad (7)$$

$$C_{PQ} = C_P * P(A|C_P) * P(M_1 U M_2 | \bar{I}) \quad (8)$$

Where:

C_F = 17-21 year old males enrolled in college full-time

$P(A|C_F)$ = proportion of full-time 17-21 year old college students who are HSDG and I-IIIAs
= .711%

C_P = 17-21 year old males who are enrolled in college part-time

$P(A|C_P)$ = proportion of part-time 17-21 year old college students who are HSDG and I-IIIAs